

Georgia Broadband Mapping

Data Submission Report *2nd Submission*

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Georgia Broadband Mapping

2nd Data Submission Report

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1 Introduction

This report is submitted along with the second data submission for the Georgia Broadband Mapping Project. This document should be read in conjunction with the first data submission report to provide a complete overview of the process. This submission includes all data collected so far per the requirements of the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program (Docket No. 0660-ZA29) Notice of Funds Availability (NOFA) and Clarifications to it. Specifically, it includes broadband data collected from broadband providers and Community Anchor Institutions data compiled from various sources for the State of GA. The State of Georgia has retained a mapping contractor, primed by The Sanborn Map Company for doing all work related to the Mapping Grant for this project.

This document provides an overview of Sanborn's progress, processes, assumptions, challenges and improvements needed for each dataset. This document is limited to Sanborn's work with broadband data and does not include information related to:

- Collection of data that are not required NTIA deliverables (e.g., ancillary data such as census demographic data or state economic data,
- Any data processing that is not directly related to NTIA deliverables (e.g., additional analysis performed for the State Of Georgia that is beyond the scope of the NTIA deliverables)
- Broadband Providers' internal processes or data handling.

Section 1 of this document explains overall project status at the time of this submission, including technical details of specific datasets. Section 2 explains the data processing changes. Section 3 explains the submission data model to NTIA, changes made to the NSGIC model and why. Section 4 explains the validation that has been done so far and what remains. Detailed schema is tracked in Appendices A and B.

2 Overall Project Status

2.1 Data Collection

This section details data collection related to NTIA deliverables which include broadband data and community anchor institution data.

2.1.1 Broadband Data

Sanborn started data collection from broadband providers by updating the Technical Requirements document to accommodate the revised NTIA requirements. This document included specific details on data formats, alternative formats, schema, data delivery, etc. Sanborn commenced data collection with the providers who submitted data for the 1st Submission. Any non-responsive providers identified in the 1st Submission were also re-contacted and encouraged to participate in this submission. In addition, any new additional providers identified from the FCC Form 477 Broadband Data Filers as of June, 2009 were approached to verify eligibility and if applicable, were asked to submit data. Of the 120 providers for the State of Georgia originally identified from the December 31, 2008 Filers list, the total number of providers that have been investigated has now risen to 148. We have extended the number of executed NDAs from 71 to 79. Please note that some companies who signed an NDA still did not provide us with their broadband data and other still submitted data without feeling the need to sign an NDA.

Of the 73 companies that were actively pursued for the 1st Submission, Sanborn extended the list to 76 active providers. The following table provides a summary of the status of each company.

Provider	Rank
360 Networks	Non-Provider
Accucom Telecommunications	Shell
AGL Networks , LLC	Non-Provider
airBand Communications, Inc.	Investigating Eligibility of Provider
Airespring, Inc.	Non-Provider
Albany, Water, Gas and Light Commission	Not Participating
Al-CALL, Inc.	Data Received - Full Dataset
AL-GA Wireless Broadband, LLC	Data Received - Full Dataset
Allied Wireless Communications Corp dba Alltel	Data Received - Full Dataset
American Fiber Network, Inc.	Non-Provider
American Fiber Systems, Inc.	Not Participating
AT&T Communications of the Southern States, LLC	Data Received - Full Dataset
AT&T Wireless	Shell
ATG Communications, LLC	Data Received - Full Dataset
Bellsouth Long Distance, Inc.	Non-Provider
Birch Communications, Inc.	Non-Provider
Birch Telecom, inc.	Shell
Blue Ridge Telephone Company	Shell
Bluebird Wireless Broadband Services, LLC	Non-Provider
Board of Water, Light & Sinking Fund Commissioners	Shell
Brantley Telephone Company, Inc.	Data Received - Full Dataset
Bright House Networks Information Services (Alaba	Data Received - Full Dataset
Brightlan LLC	Contact Made, No NDA Executed
Broadcore, Inc.	Non-Provider
BroadRiver, Inc. & BroadRiver Comuncations Corp	Non-Provider
Broadstar, LLC d/b/a PrimeCast	Not Participating
Broadview Networks, Inc.	Non-Provider
Broadwing Communications, LLC	Shell
Bulldog Cable Georgia	Shell
Bulloch Telephone Cooperative	Data Received - Full Dataset
BullsEye Telecom, Inc.	Non-Provider
Business Telecom, Inc.	Shell
Camden Telephone & Telegraph Co., Inc.	Shell
Cavalier Telephone LLC or Talk America	Data Received - Full Dataset
Cbeyond Communications, LLC	Non-Provider
Cellco Partnership	Shell
CenturyTel dba Coastal Utilities, Inc.	Data Received - Full Dataset
Charter Communications	Data Received - Full Dataset
Chickamauga Telephone Corporation	Data Received - Full Dataset
CIMCO Communications, Inc.	Non-Provider
Citizens Telephone Company, Inc.	Data Received - Full Dataset
City of Cairo, GA	Data Received - Full Dataset
City of Camilla d/b/a South Georgia Gov't Svcs.	Data Received - Full Dataset
City of Cartersville	Contact Made, No NDA Executed
City of LaGrange	Not Participating

City of Manchester	Contact Made, No NDA Executed
City of Moultrie	Data Received - Full Dataset
City of Thomasville Utilities	Data Received - Full Dataset
City of Tifton	Shell
Clearwire	Data Received - Full Dataset
Cogent Communications Group	Data Received - Full Dataset
Comcast Corporation	Data Received - Partial
ComSouth	Data Received - Partial
ComSouth Telenet, Inc.	Shell
Covad Communications Company	Data Received - Full Dataset
Cox Communications, Inc.	Data Received - Full Dataset
Dalton Utilities	Contact Made, No NDA Executed
Darien Telephone Co., Inc.	Data Received - Full Dataset
DeltaCom, Inc.	Data Received - Full Dataset
Digital Agent, LLC	Contact Made, No NDA Executed
DoveTel Communications, LLC	Not Participating
DSLnet Communications, LLC	Data Received - Full Dataset
Dycom Holding, Inc.	Shell
ELBERTON , City of	Data Received - Full Dataset
Ellijay Telephone Company	Data Received - Full Dataset
Enventis Telecom Inc.	Non-Provider
ETC Communications, LLC	Shell
FiberLight, LLC	Not Participating
Flint Cable TV, Inc.	Not Participating
Fort Valley Utility Commission	Data Received - Full Dataset
Frontier Communications of Georgia, Inc.	Data Received - Full Dataset
Georgia Public Web, Inc.	Not Participating
GEORGIA RSA # 8 PARTNERSHIP Limited Partnership d/	Shell
Glenwood Telephone Company	Data Received - Full Dataset
Global Crossing North American Networks, Inc.	Non-Provider
GTC, Inc.	Data Received - Full Dataset
Harbor Communications	Non-Provider
Hargray of Georgia, Inc.	Data Received - Full Dataset
Hart Telephone Company	Data Received - Full Dataset
HNS License Sub, LLC	Not Participating
Interglobe Communications, Inc.	Contact Made, No NDA Executed
ITC Globe, Inc.	Shell
James Cable LLC	Data Received - Full Dataset
Kennedy Cablevision Inc.	Not Participating
Kings Bay Communications, Inc.	Data Received - Full Dataset
KLiP, LLC	NDA Done, Data not Received
Knology, Inc.	Data Received - Partial
Leap Wireless International, Inc./Cricket Comm	Data Received - Full Dataset
Level 3 Communications, LLC	Data Received - Full Dataset
LightEdge Solutions, Inc.	Non-Provider
Lintel, Inc.	Non-Provider
Madison River Communications, LLC	Shell
Mediacom Communications Corp & MCC Georgia LLC	Data Received - Full Dataset

Megapath	Shell
Metropolitan Telecommunications of Georgia, Inc.	Non-Provider
Nelson-Ball Ground Telephone Company	Shell
Netlogic, Inc.	Non-Provider
New Cingular Wireless Services, Inc.	Shell
New Edge	Non-Provider
Nextlink Wireless, Inc.	Data Received - Full Dataset
Northland Cable Properties Eight Limited Partnersh	Not Participating
Northland Cable Properties Seven Limited Partnersh	Shell
Northland Cable Properties, Inc.	Shell
Northland Cable Television, Inc.	Shell
NuLink Digital	Data Received - Partial
NuVox Communications, Inc.	Shell
Pembroke Telephone Company, Inc.	Data Received - Full Dataset
Pineland Telephone Cooperative, Inc.	Data Received - Full Dataset
Plant Telephone Company	Data Received - Full Dataset
Plant Tifnet	Shell
Plantation Cablevision, Inc.	NDA Done, Data not Received
Planters Rural Telephone Cooperative, Inc.	Data Received - Partial
Progressive Rural Telephone Co-op., Inc.	Data Received - Full Dataset
Public Service Telephone Company	Data Received - Partial
Quincy Telephone Company	Shell
Qwest Communications International, Inc.	Non-Provider
Reliance Globalcom Services, Inc.	Non-Provider
Ringgold Telephone Company	Not Participating
Shentel Converged Services, Inc.	Data Received - Full Dataset
SkyWay USA	Contact Made, No NDA Executed
Smart Choice Communications, LLC	Non-Provider
Smartresort Co., LLC d/b/a/ Beyond Communications	Not Participating
South GA Governmental Services Authority	Data Received - Full Dataset
South Georgia Regional Information Technology Auth	Data Received - Full Dataset
Southeastern Services, Inc.	Data Received - Full Dataset
Sprint Nextel Corporation	Data Received - Full Dataset
StarBand Communications, Inc.	Not Participating
TDS Telecomm	Data Received - Full Dataset
Telefonica USA, Inc.	Non-Provider
Telovations, Inc.	Non-Provider
T-Mobile bought out Deutsche Telekom Ag	Data Received - Full Dataset
Trenton Telephone Company	Not Participating
tw telecom of georgia l.p.	Data Received - Full Dataset
US LEC of Georgia Inc.	Difficulty Contacting
Valley Cable TV, Inc.	Shell
Verizon Communications d/b/a Verizon Business Glob	Data Received - Full Dataset
Verizon Wireless	Data Received - Full Dataset
ViaSat Inc.	Shell
Wave2Wave Communications, Inc. & RNK	Data Received - Full Dataset
Waverly Hall Telephone, LLC	Data Received - Full Dataset
Waycross Cable Co., Inc. d/b/a MediaStream	Data Received - Full Dataset

WildBlue Communications, Inc.	Data Received - Full Dataset
Wilkes Telephone & Electric Company	Data Received - Partial
WilTel Communications, LLC	Shell
Windjammer Communications LLC	NDA Done, Data not Received
Windstream Georgia Telephone bought Accucomm Telec	Data Received - Full Dataset
XO Communications, LLC	Data Received - Full Dataset
Zayo Group, LLC	Investigating Eligibility of Provider

Sanborn included consideration of the following guidelines to our work (based on NTIA discussions, other assumptions, etc) and we learned the following in our data collection efforts:

- 1) Sanborn did not include resellers in this submission – resellers were contacted and those that identified themselves as resellers were flagged as such. On the above table they are classified as ‘Non-Provider’.
- 2) Sanborn did not include data from satellite providers if the only data submission from them included a description of service which comprised the whole state without any specific delineation of where in the state such providers can serve.
 - a. Three satellite providers have been identified in Georgia – HNS, Starband and Wildblue Communications.
 - i. NHS was still unable to provide data in a format to meet the NTIA requirements. Submission of address level information was not possible due to their contractual terms with their end users. Their submission could only show 100% coverage of an entire area without any detail of land topography line of sight issues.
 - ii. Starband was still unable to identify details of land topography line of sight issues and could only supply state wide coverage so was excluded from this submission also.
 - iii. Wildblue data has been submitted to NTIA in this phase.
- 3) Sanborn has contacted non-responsive provider's at least 4 times using email, and phone contacts (including the email with Technical Requirements). In general, Sanborn has made more than 4 contacts with many of these providers and offered them every possible scenario of data submission.
- 4) Where providers were unable to provide the weighted average speed at a county level and submitted data at the RSA level, the records were dropped.
- 5) Affiliates, subsidiaries etc. have been counted as providers. Please note that data for these entities may or may not be reported as a separate FRN if they share the same FRN as their parent company. Sanborn has used the term “shells” to describe these companies in the spreadsheet and in the table above.
- 6) Most of the rural telcos were not able to provide data in the format required by NTIA. Some rural telcos were able to provide their FCC data, boundary information of their coverage area, and some textual description on speeds, technology of transmission, etc. Sanborn accepted their broadband data in whatever form available, then created data products to meet NTIA requirements as closely as possible.
- 7) In our efforts to be as complete as possible, Sanborn contacted more providers than those identified on the FCC list of broadband providers, e.g., public providers such as municipal providers and Public Utility Districts. .
- 8) Sanborn originally requested data for the 2nd Submission in Census 2009 blocks and street segments in Census 2009 TIGER street centerline data. For the 1st Submission, providers mostly supplied data in a mixture of 2000 and 2009 Census formats. Sanborn had already made the decision

for providers who had previously submitted 2000 data and no changes were required, we would post process the data to the 2009 version. When the requirement changed mid way through the data collection cycle back to 2000 Census data, the amount of data collected was too great to go back to providers to request information again. Sanborn took the decision that where 2009 was received, we would post process the data back to 2000 rather than requesting all new data.

- 9) We have not included in our data any middle mile data that fall outside the State of Georgia, even where providers have indicated that they are using an out-of-state middle mile facility to service the State. In many cases, providers stated they do not have facilities in the State of Georgia. In such cases, we have removed facilities outside of the State of Georgia, even though we understand that middle mile facilities outside of state boundaries can be used to provide redundancy in networks or used for other purposes. For this submission, we assumed we need only make available to NTIA the facilities located physically in Georgia. For the next submission, Sanborn seeks clarification from NTIA whether facilities outside of the state should also be submitted, where those facilities also are used for provisioning broadband service to Georgia.
- 10) For Wireless providers operating under more than one spectrum, we were unable to obtain separate shapefiles detailing individual spectrum coverage areas. To comply with the NITA requirement of separate shapefile, Sanborn has replicated the coverage area for each spectrum.

Challenges related to data collection include:

- a. Changing data format requirements: Some of the revised requirements for data were not well received from providers. The requirement to submit separate shapefiles for each spectrum from Wireless providers was unanimously rejected. We failed to collect data in this format from any GA Wireless provider. The change from RSA to county and census block for maximum speed and weighted speed created substantial issues for one major provider.
- b. 2000 vs. 2009 Census Data: The constant flux concerning the use of 2000 vs. 2009 census resulted in an extraordinary amount of additional time and effort to process the data.
- c. Satellite Providers: The dealings with satellite providers continues to present a challenge obtaining data in a format acceptable to the NTIA criteria.

2.1.2 Community Anchor Institutions Data

Initial Community Anchor Institutions (CAI) data for the State of Georgia was gathered through a collaborative effort between the GTA and the Sanborn team. Data was gathered from the Georgia Department of Education, Georgia Homeland Security (HSIP Freedom), and Georgia Department of Community

Affairs. These data sets included the following features that were aggregated into the BB_Service_CAInstitutions data set:

Source	Description	BB CAI Category
GA DOE	K-12 Schools	1: School – K through 12
HSIP	Colleges	5: University, College, other
HSIP	EMS	4: Public Safety
HSIP	Corrections	4: Public Safety
HSIP	Fire Station	4: Public Safety
HSIP	Law Enforcement	4: Public Safety
HSIP	Hospital	3: Medical/Healthcare
HSIP	Public Health Department	3: Medical/Healthcare
HSIP	Nursing Home	3: Medical/Healthcare
HSIP	State Building	6: Other community support Govt
DCA	Library	2: Library
DCA	City Hall	6: Other community support Govt
DCA	Court	6: Other community support Govt
DCA	School	5: University, College, other

During this delivery period the team was successful in gathering the base source CAI data and initiating and hosting a series of discussion on the CAI portal. Time was spent with the various stakeholders working on planning the design, layout, function and environment for the hosting. The CAI portal portion of the GA Broadband web applications is up and running, but was only made live shortly before the NTIA submission so no data has been gathered yet.

The web applications for the State's Broadband Mapping program include:

- 1) The Information Portal which contains basic project information, maps, etc., and is the typical launch point for the rest of the applications. This portal also includes updated news posted through a Twitter feed, Program Goals, and a Map Gallery interface.
- 2) The Speed Test is a tool that can be attached to multiple web sites that allows users to test their broadband connection speed, and provide the State with valuable information to be used during validation of data from providers.
- 3) The Public Broadband Survey is another tool that is intended to collect important information from the public regarding their broadband access (or lack thereof). This can also be attached to numerous high-traffic web sites in order to gather input from the public.
- 4) The Community Anchor Institution application is a secure survey for the institutions to enter information about their access, per the NOFA requirements. The institutions will also take a speed test.

5) The Interactive Mapping application is where the general public will ultimately go to search for their location and view information about broadband access and providers in their area.

All of these applications except the Interactive Mapping are operational and running on the State of Georgia hosting facility. This site can be accessed at:

<http://broadband.georgia.gov/mapping>

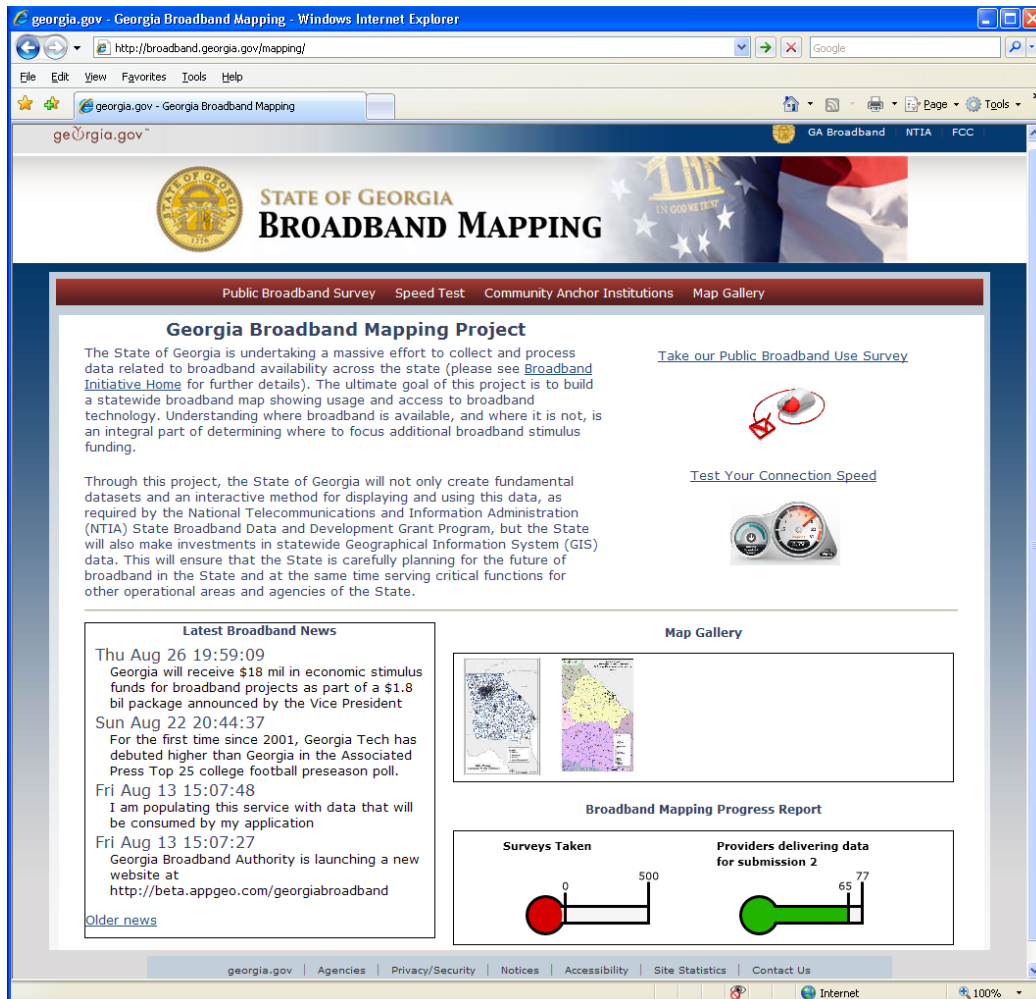


Figure 1 - Georgia Broadband Mapping Web Site

Public Broadband Survey

The Public Broadband Survey is intended to gather information from the General Public regarding their current broadband service at a specific location. After specifying their service location, the user is presented with a series of survey questions and is prompted to take a speed test to characterize their current service.

The screenshot shows a web browser window titled "Broadband Use Survey - Windows Internet Explorer". The address bar displays "http://broadband.georgia.gov/mapping/PublicOnlineSurvey.aspx". The page features the Georgia state seal and the text "STATE OF GEORGIA BROADBAND MAPPING". A navigation bar includes links for "Public Broadband Survey", "Speed Test", "Community Anchor Institutions", and "Map Gallery". The main heading is "Broadband Use Survey". Below this, a definition of broadband service is provided, followed by a request to complete a short survey. A red asterisk indicates required fields. The survey begins with the prompt "Please enter your address below:". A map interface shows a location on Main St in Savannah, GA, with a blue pin and a confirmation dialog asking "Is this the correct location for your address?". A "Locate Address" search box displays a list of address candidates: 27 MAIN ST, SAVANNAH, GA, 31408; 35 MAIN ST, SAVANNAH, GA, 31408; 41 MAIN ST, SAVANNAH, GA, 31408; 77 MAIN ST, SAVANNAH, GA, 31408; and 79 MAIN ST, SAVANNAH, GA, 31408. Below the map, a question asks "Are you currently located at the point specified above?" with "Yes" and "No" radio button options. At the bottom, question 1 asks "Do you currently have broadband service at this location?". The browser's status bar shows "Done" and "Internet" with a 100% zoom level.

Figure 2 - Public Survey Input Service Location

Broadband Use Survey - Windows Internet Explorer

http://broadband.georgia.gov/mapping/PublicOnlineSurvey.aspx

Please enter your address below:

Are you currently located at the point specified above?

☒ Yes ☐ No

Click to begin test

1. Do you currently have broadband service at this location?

☒ Yes ☐ Not Using ☐ I Don't Know

2. What type of broadband technology do you use at this location?

3. Who is your broadband provider?

4. How much do you pay per month for broadband service?

5. What is the DOWNLOAD speed advertised by your broadband provider?

Figure 3 - Public Survey Questions and Speed Test

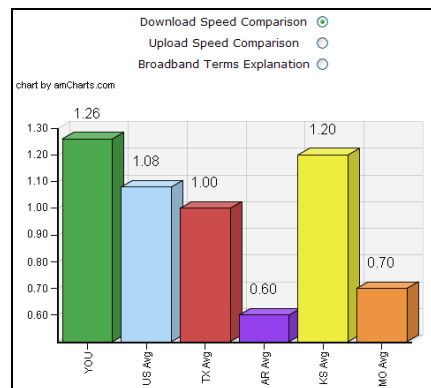
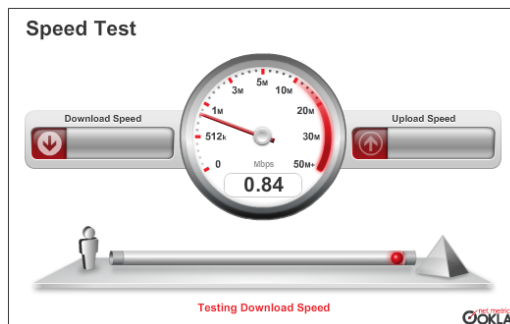


Figure 4 - Speed Test and Download/Upload Results

Community Anchor Institutions (CAI)

There are seven categories of community anchor institutions that the Federal government is primarily interested in assessing:

- Schools K-12
- Libraries
- Colleges, Universities, Other
- Public Safety Facilities
- Medical/Healthcare Facilities
- Other Community Support – Government
- Other Community Support – Non-governmental

The known location of these institutions has been loaded into the CAI application and a secure login is provided to each category. The objective is to gather information on CAI's existing broadband service and identify any missing facilities. Once a user has logged in, the existing institution can be selected and a series of survey questions are presented along with the ability to take a speed test.

The screenshot shows a web browser window titled "Community Anchor Institution Survey - Windows Internet Explorer". The address bar shows the URL "http://broadband.georgia.gov/mapping/CommunitySurvey.aspx". The page header includes the "georgia.gov" logo and navigation links for "GA Broadband", "NTIA", and "FCC". The main content area is titled "STATE OF GEORGIA BROADBAND MAPPING" and features a navigation bar with links for "Public Broadband Survey", "Speed Test", "Community Anchor Institutions", and "Map Gallery". The "Community Anchor Institution Survey" section includes a "Logout" link and a description of the survey's purpose: "This survey is intended to gather information for the Georgia Broadband Mapping program on Community Anchor Institutions. Its primary purpose is to: Identify Missing Institutions, Confirm the Location of Identified Institutions, Gather Information on Current or Future Broadband Usage, and Validate the Speed of the Current Broadband Connection." It also states, "Please answer the following questions to the best of your knowledge. * denotes a required field". The survey questions are: "What Category best describes the Institution?" (with a dropdown menu set to "School (K through 12)"), "1. Please choose the county the Institution is in" (with a dropdown menu set to "Burke County"), and "2. Please Select the Institution from the list" (with a dropdown menu showing a list of schools, including "Burke County High School" which is highlighted). Below these questions are fields for "Updated By" (with a "Name:" label and a text input field) and "Organization:" (with a text input field). The footer of the page contains links for "georgia.gov", "Agencies", "Privacy/Security", "Notices", "Accessibility", "Site Statistics", and "Contact Us".

Figure 5 - Community Anchor Institution Survey

Community Anchor Institution Survey - Windows Internet Explorer

http://broadband.georgia.gov/mapping/CommunitySurvey.aspx

File Edit View Favorites Tools Help

Community Anchor Institution Survey

*3. Does the Institution subscribe to Broadband Service at this location? ☒ Yes ☐ No

Imagery Map

Map showing location of Mobilization, Southside Dr, and Southside Dr. A red dot marks the location. A compass rose is visible in the bottom left corner of the map area.

*4. Is your current physical location within the Community Anchor Institution address provided above? ☒ Yes ☐ No

Click to begin test

Updated By

Name: Ned Jackson

Organization: County School Administrator

*5. Who is your Broadband Provider?

*6. What type of technology is used for your Institution's Broadband Service?

7. What is the DOWNLOAD speed advertised by your Broadband provider?

8. What is the UPLOAD speed advertised by your Broadband provider?

9. How is your organization currently using broadband internet access? (Select all that apply)

Asymmetric xDSL
Symmetric xDSL
Other Copper Wireline
Cable Modem—DOCSIS 3.0
Cable Modem—Other
Optical Carrier/Fiber to the End User
Satellite
Terrestrial Fixed Wireless—Unlicensed
Terrestrial Fixed Wireless—Licensed
Terrestrial Mobile Wireless
Electric Power Line
Other
I don't know, I will come back later to fill in this information

Figure 6 - CAI Survey Questions and Map Location

The web application also provides the ability to view Site Statistics for information gathered:

Site Statistics	
Speed Test Data	
Total Speed Tests:	7
CAI Speed Tests:	2
Public Speed Tests:	0
Average Download Speed:	38.7877 Mbps
Average Upload Speed:	21.2407 Mbps
CAIs	
Total CAI Updates Submitted:	2
New CAIs Reported:	1
Total CAIs Reporting In:	2
Total Listed CAIs Reported:	8833
Updated Records by Type	
Schools (K-12):	1
Libraries:	1
Medical and Health Care Providers:	0
Public Safety:	0
Universities/Colleges/Higher Education:	0
Governmental Community Support:	0
Non-governmental Community Support:	0

Figure 7- Site Statistics

2.2 Data Processing

2.2.1 General Overview

In general, the submission 2 processes followed the same basic approach that was used in submission 1. Full details of the processing steps can be found in the Submission 1 report. However, the following sections outline the modifications made to the initial processing in order to meet the submission 2 requirements as defined by NTIA.

In summary they can be divided into the following three categories:

- Process Modifications
- Reference Data Modifications
- NTIA Submission Data Model Schema Changes

2.2.2 Submission 2 Process Modifications

Based on NTIA feedback and information provided in NTIA webinar sessions, the submission 2 data processing workflow was changed to support the new NTIA submission requirements:

1. Submission 2 requires a geodatabase with spatial features for all submitted datasets. Initially, submission 1 required text files (as specified in the NOFA) which were delivered along with a wireless shapefile in an interim delivery. Prior to the actual first submission, NTIA suggested a geodatabase format without definitive guidance on a data model. Subsequently, NTIA suggested the use of the NSGIC version 2 data model for broadband submission. For submission 2, NTIA has formalized the file geodatabase that we have used.
2. Submission 2 data processing required the use of 2000 Census data for the identification reference for Census blocks. During submission 1, many states used 2009 data, which offered better spatial accuracy and completeness. This more accurate data was used to perform an evaluation of whether each Census block was less than or greater than 2 square miles. The requirement in submission 2 to use 2000 census data forced the reevaluation of the size of a census block and changed the representation of a provider's data by blocks or roads. This impacted data processing because many providers simply said to reuse their submission 1 data which sometimes used Census 2009 reference data, but now this data had to be reevaluated with the use of the Census 2000 reference data.
3. Per NTIA requirements the source for the roads reference layer is allowed to be the best available source that the state has available. For consistent representation the state road reference data used was Census Tiger Line IDs (TLIDs).

4. Max advertised speed (up/down) should be stored within the blocks, roads, and wireless area datasets.
5. The weighted average speed alternate format will no longer be accepted.
6. Weighted Average Speed is being submitted on a county basis, and was used to populate the new Overview table.
7. Due to our NDA restrictions, address points and last mile points will not be submitted to NTIA.
8. Wireless coverage should be provided with unique shapes for each spectrum utilized.
9. Terrestrial Mobile Wireless and Terrestrial Fixed Wireless - Licensed were treated as wireless coverage and were delivered as a shape. These types of wireless were not represented in the block and road datasets. We also represent Terrestrial Fixed Wireless – unlicensed with a wireless coverage polygon.
10. If provided, Franchise Area will be captured during the ingest process, and kept for use during the validation process. These areas are not being submitted to NTIA.
11. All Provider data and Community Anchor Institutions (CAI) locations should be clipped to the state's boundary. During submission 1, some CAI locations, address points, middle mile points and wireless coverage areas were located just over the border in neighboring states.
12. The submission 2 Provider data model is currently based on the NTIA data model as of September 8, 2010. All proposed changes have been incorporated into the data submitted with this delivery. Any changes are documented in the Provider Data Model Schema changes section of this document.
13. Records dropped during data processing will have an associated reason code, and they will not be submitted to NTIA. Dropped records were maintained in a separate similarly formatted dataset and given to the providers so they had an opportunity to correct any issues. Records without required attributes were not submitted to NTIA.
14. The end-user category has been removed from the submission data model for blocks and roads, and is no longer a provider data requirement.

2.2.2.1 BB_Service_Overview Processing Issues

All BB_Service_Overview features for all providers have been eliminated from the submission due to the following:

NTIA clearly stated that they were mostly interested in Technology of Transmission and the associated Max Advertised Up and Down speeds

by Provider. NTIA also stated that their preference was to have this Tech Trans, Max Adv Up/Down on the Blocks and Roads. But if we couldn't get it for the individual Blocks and Roads they would take it in a Service Overview table.

Our approach was to get the Tech Trans and Max Adv Up/Down on the Blocks and Roads, so the Service Overview really only contained the Weighted Avg Speed that was gathered.

In the NTIA data model, the BB_Service_Overview feature class attributes MaxAdDown and MaxAdUp cannot be Null. Since these values were on the Blocks and Roads, there were no values for the BB_Service_Overview county records.

The question was repeated asked of the NTIA as to whether we could alter the data model to allow for delivering weighted speeds without an associated max advertised speed by county. Every time NTIA responded that they did not want us to make the change, and that their primary interest for the overview table was to capture advertised speeds that could not be provided at the block and road level.

It was not appropriate to push the max advertised up/down from the blocks and roads back to the County geography. If a provider only served a small portion of the County, it was misleading to characterize the entire County for that provider at a max advertised up/down speed based upon the blocks and roads information.

2.2.2.2 BB_Service_CAIstitutions Processing Issues

CAI records where no Zip5 values were provided will be deleted, until the CAI can confirm the valid Zip 5 value to use.

Since TransTech is required and is used to define the subtypes within the data model, Sanborn had to override the model and calculate the TransTech as Null values if this information had not been received from the CAIs.

At this stage of the project in GA, CAIs had not gone into the BB Web Application to confirm their data and respond to the survey where TransTech is gathered. It is anticipated this issue will be resolved for Submission 3.

2.2.2.3 Speed Tiers Processing Issues

With several Providers giving data with speed tiers outside of the NTIA model domain values for the Technology of Transmission, it was decided to simply pass these speed tier values through with the data.

The additional domain values were not added into the tables by Tech Type, the values will simply show up in the NTIA Submission data without an associated domain description in the table. The NTIA was made aware of this situation in several States during the 9/29/2010 webinar and their recommendation was to submit that data.

The only data that was eliminated for the NTIA submission was any data that did not meet the strict NTIA definition of broadband per the NOFA (200 kbps up and 768 kbps down).

2.2.3 Submission 2: Reference Data Modifications

This section describes the reference data schema that will be used during the *Reference Data Setup* process described later in this document. Reference Data is geometric data used in the NTIA broadband data processing for reporting all collected provider data. Three submission datasets require reference data: block data, road segment data, and overview data. This section provides a description and analysis of the input reference data and a strategy for transforming it into a reference data schema. The reference data schema and associated domains are described in Appendix 1.

2.2.4 Creation Of Processing Reference Data

During submission 1, provider service delivery data were joined by primary key (i.e. TLID, BLOCKID) to the reference data required by NTIA for submission. Reference data sets were collected and stored by year and type for each state. This raised a number of issues:

- Multiple reference datasets were maintained
- No clear method to define the reference source dataset use for any given feature submitted to NTIA
- In some cases, multiple road data sources were used to improve the road geometry. This increased the time required for analysis.
- Each state processed independently decided projection and reference data specification

Major improvements in geometry accuracy are contained in the 2009 Census block data. Some of the 2009 Census blocks are subdivisions of 2000 Census blocks. These smaller block sizes reflect changes in population, etc. Each of these subdivided blocks adds a single character alphabetic suffix to the 2000 Block ID.

NTIA guidance requested use of 2000 Census data for submission 2, however, the geometry improvements and the addition of new features of the 2009 data suggested that a hybrid dataset using the 2000 id system and the 2009 geometry should be used for submission 2 data processing. For the final delivery to NTIA, all geometry was reverted back to the Census 2000 format.

The following is a summary of other key decisions regarding the reference data processing:

- All reference data will be combined to from three feature classes for data processing use (i.e. Block, Road Segments, and Overview)
- Only data needed during broadband data processing will be retained (i.e. extra-unused reference columns will be dropped). For instance, State, County, Tract, and Block fields can be generated from the full BlockID field during the publishing process, so these fields are not tracked through the reference file creation process.
- All reference data column names and data types are based on the NSGIC guidance contained in the geodatabase description working paper dated 4/8/10.
- All reference data column names will be prefixed with “ref_” – to indicate to future data processing steps – the data’s origin as reference data (opposed to provider data).

2.2.5 Reference File Projection

WGS_1984_Web_Mercator will be the projection used for all submission 2 reference data processing per NSGIC guidance contained in the geodatabase description working paper dated 4/8/10.

2.2.6 Block Reference

During the block reference file setup, the 2009 BlockID suffix is dropped and the blocks are dissolved (by Block ID) to produce data with 2000 BlockIDs and 2009 shape geometry. This hybrid allows the most recent geometry to be used with provider data that is based on the 2000 census BlockID.

- The ref_CBYear (Census Block Year) column will be set to “HYBR”
- Block size (AREA) is calculated combining the 2000 land area (ALAND) and water area (AWATER)
- AREA converted from square meters to square miles to calculate square mileage (SMI).
- If the SMI of a block is less than or equal to 2, then the less than or equal to 2 square mile indicator (LE2SMI) is set to true.

2.2.7 Road Reference

Tiger Line IDs (TLIDs), the key column for Census road data, are maintained between the 2000 and 2009 Census data. However, modifications, such as the splitting of a road segment to include a new road intersection, will produce new segments with new TLIDs. One goal of the road reference creation is to make all

possible TLID values available for processing. In this example, a provider might use the 2000 TLID for the full segment, or the 2009 TLID for one of the split segments. The combination of the two files may produce duplicate TLIDs, one with 2000 geometry and one with 2009 geometry. To take advantage of the 2009 geometry improvements, when a duplicate TLID is encountered, the one with the 2000 geometry is removed.

- The ref_CBYear (Census Block Year) column is set to indicate the origin year of the road reference data (2000, 2009)
- The GT2SMI (Greater Than 2 Square Mile) indicator is set to True when:
 - I. The 2009 road segment is completely within a hybrid block that is NOT LE2SMI (not less than 2 square miles)
 - II. The 2000 road segment's centroid is within a 2000 block that is NOT LE2SMI (not less than 2 square miles). The centroid is used because of poor road alignment between the 2000 roads and block.
- Only minimum and maximum address ranges and a single zip code for each road segment is maintained.
 - I. In preparation for arithmetic calculations based on address ranges, all extra left and right, as well as address ranges that include alphabetic characters are dropped.

2.2.8 Overview Reference

Overview data in submission 1 contained three separate feature classes; maximum speed, weighted speed, and pricing data. During submission 1 three separate reference sources (County, CMA, MSA) were also accepted for each of these. In submission 2, all maximum speed data was processed at the block, road, or wireless shape area. Overview was only used to maintain the weighted speed information, and in this submission, only County is accepted as a geography type.

2.2.9 Reference data sources

The following data sources were used as reference data sources for submission 2:

2.2.9.1 Block Reference Data: 2009 Census Blocks

The 2009 Census Block data is the most recent geometry provided by the US Census Bureau and has these characteristics:

- The full Block ID is allotted 17 characters (even though the sum of the component parts only adds up to 16 characters):
 - (2) State
 - (3) County
 - (6) Tract
 - (4) Block

- (1) Suffix - The 2009 Census Block data allocates a one-character alphabetic suffix to the end of a 2000 Block ID for all blocks that have been subdivided
- Fields of interest include:
 - [BLKIDFP]:: char(17) – Full Block ID
 - [ALAND] :: double(14) – Land Area
 - [AWATER] :: double(14) – Water Area
- The 2009 Census block geometry has been adjusted to correspond with the revised and amended 2009 Census road data.
- This 2009 data represents the new standard for sharing statistical data and is good for matching to the results from our processing. However, historical data may not match this Block ID system.
- This data was downloaded for each state from the following website:
<http://www2.census.gov/cgi-bin/shapefiles2009/national-files>

2.2.9.2 Road Reference Data: 2000 Census Tiger Lines

The 2000 Census Tiger Line data contains geometry used during the 2000 Census Bureau. The following is a list of characteristics:

- The Tiger Line Identification (TLID) system is stored as a double data type, although it contains only integer values
- Fields of interest include:
 - [TLID] :: double(10) –Originally long integer in TGR file spec (Tiger Line ID)
 - [FEDIRP] :: char(2) – (Feature Prefix Direction)
 - [FENAME] :: char(30) – (Feature Name)
 - [FETYPE] :: char(4) – (Feature Type)
 - [FEDIRS] :: char(2) – (Feature Suffix Direction)
 - [FRADDL] :: double(11) – Originally text field in TGR file spec (From Address Left)
 - [TOADDL] :: double(11) – Originally text field in TGR file spec (To Address Left)
 - [FRADDR] :: double(11) – Originally text field in TGR file spec (From Address Right)
 - [TOADDR] :: double(11) – Originally text field in TGR file spec (To Address Right)
 - [ZIPL] :: char(5) – (Zip Left)
 - [ZIPR] :: char(5) – (Zip Right)
- The Census road data is packaged by county. Roads that exist as the boundary between counties will be duplicated in both county files.
- This data has been the standard format for outputting statistical data for the last decade
- This data was downloaded by county as road segments from the following website:

2.2.9.3 Road Reference Data: 2009 Census Tiger Lines

The 2009 Census Tiger Line data contains the most recent geometry provided by the Census Bureau. The following is a list of characteristics:

- The Tiger Line Identification (TLID) system is stored as a double data type, although it contains only integer values
- Fields of interest include:
 - [TLID] :: double(10) -- (Tiger Line ID)
 - [FULLNAME] :: char(100) – (Full Name)
 - [LFROMADD] :: char(12) – (Left From Address)
 - [LTOADD] :: char(12) – (Left To Address)
 - [RFROMADD] :: char(12) – (Right From Address)
 - [RTOADD] :: char(12) – (Right To Address)
 - [ZIPL] :: char(5) – (Zip Left)
 - [ZIPR] :: char(5) – (Zip Right)
 - [ROADFLG] :: char(1) – (Road Flag – Is segment a road?)
- The 2009 Census Tiger Line road segment geometry was adjusted to correct 2000 segments misalignment; street name, type and directional information were concatenated into one database column (FULLNAME) and new road segments were added.
- The Census road data is packaged by county. Roads that exist as the boundary between counties will be duplicated in both county files.
- This data represents the new standard for sharing statistical data
- This data was downloaded by county as full tiger line data at the following website:
<http://www2.census.gov/cgi-bin/shapefiles2009/national-files>
 - Source data was filtered by row were [ROADFLG] = yes to create the reference data set.

Note: Where roads were split, because of road alignment correction or new road additions, new reference (TLID) values were assigned to the new road segments by the Census in the 2009 data set.

2.2.9.4 Overview Reference Data: 2009 Census Counties

The 2009 Census County Boundaries are used for reporting of Weighted Average Speed. The following is a list of characteristics:

- The County identification number is stored as a text and allotted 5 characters
- Fields of interest include:
 - [COUNTYIDPF] :: char (15) (County Identification Postfix)
 - [NAME] :: char (100) (Name)
- This data was downloaded from the following website:
<http://www2.census.gov/cgi-bin/shapefiles2009/national-files>

2.2.10 Submission 2: NTIA Submission Data Model Schema Changes

This section of the document describes the strategy that was used for the development of the specific data schema used for the NTIA submission 2 provider data. The current data model schema is in Appendix 2.

2.2.10.1 Schema History And Evolution

In submission 1, NTIA asked the National States Geographic Information Council (NSGIC) to comment and provide a spatial data model that can provide a common format for data submitted to NTIA. The initial NSGIC data model released had a number of flaws that clearly needed to be resolved.

NSGIC released the version 2 of the data model close to the submission 1 delivery date. The new model has improved functionality and conforms more closely to the NTIA submission requirements. The NSGIC version 2 model was used as the basis for our internal processing models and for submission 2.

After submission 1, NTIA took ownership of the submission data model, but did not release any changes until mid August. The NSCIG version 2 was used as the basis for our internal processing models. The submission 2 NTIA data model is similar to the NSCIG version 2 model. To retain as much of the NSGIC v2 /NTIA spatial data model as possible, the relationship between the provider data and the output specification is kept as simple as possible. Here are a few key NTIA submission data model design considerations:

- Submission feature class names reflected the names in the NSGIC v2 specification
- Column data types are based on the NSGIC v2 specification
- Where possible, field names retained the naming conventions of the NSGIC specification
- All road segment address information used the NSGIC specification of a single min, max, zip for each feature
- The data schema for wireless data follows the NSGIC specification for submitting a single feature per spectrum
- To retain Provider Source Information the ID field is calculated as State Name Abbreviation “_”, Short Name. The ID field exists in the NSGIC v2 data model, but not the final NTIA submission 2 delivery model. This column is used during processing and was dropped during final processing, prior to submission to NTIA.
- Any Overview records that were not submitted using State-County codes were not delivered.

2.3 NTIA Data Model Changes

During the processing of provider data for submission 2, a number of issues were raised about the data model requirements proposed by NTIA. A number of specific errors, such as typographical errors in domain values, or inconsistency surrounding processing of null values, etc., were documented and forwarded to NTIA for response. The issues and resolution are included in Appendix 2: NTIA Submission Dataset Schema Changes the end of this document.

Based on changes made to the NTIA data model, some data processing procedures were required to populate the current NTIA data model. The following is a list of specific data processing changes that have been implemented:

- The following are the rules for removing records for the NTIA submission based on technology sub-types and their associated valid speed tier codes:
 - Basic Assumptions:
 - Follow domain speed tier codes for each technology subtype
 - MaxAdv is only required in wireless
 - MaxAdv can be null in blocks/roads
 - Typical speeds can be null in blocks, roads, or wireless
 - Criteria for removing records from Blocks/Roads (wireline)
 - Remove records with invalid MaxAdv speeds
 - Criteria for removing records from Wireless
 - Remove records with invalid MaxAdv speeds
 - Remove records with null MaxAdv speeds
- In addition, the following processing changes are now performed during post-processing and before the final NTIA submission:
 - There is a new feature class called State Boundary. These shapes were prepped and added to the reference datasets for each state. For NTIA submission output, these were moved into their own feature class.
 - The Blocks table has the Block ID separately defined as State, County, Tract, and Block ID. The provider data as processed include the full 15-digit FIPS code, which has been parsed to populate these fields.
 - ID columns no longer exist. They have been dropped from the final processed data.
 - The Middle Mile, Overview, and Wireless tables all have a field called StateAbbr (2 character alphabetic code). The final publishing script created and populated the StateAbbr field.
 - In the Roads table, the Ref_ Values are used for Street info and Zip Code. Because the processing produces a null value for Ref_City, the City field is populated with Dlv_City.

- TransTech was converted from string to small integer.
- Any record with a TransTech value of X, Y, or Z was dropped.
- Any other field with a value of X, Y, or Z was set to null.
- Any Elevation with a -9999, -9998, or -9997 was set to null.
- Any FRN generated during processing (those starting with 00000000__) were converted to a value of 9999.
- In the Blocks and Roads tables there are new fields called Reseller. Because only data from actual providers was accepted, this field was set to 'No' for all records.
- Block geometry was converted from hybrid geometry back to 2000 Census geometry.
- Sub-domains are based on technology types and allowable speeds, but the internal processing model does not. During the publishing phase, any block, road or wireless data that did not comply with these domain rules were dropped. During the Webinar on 29 Sep 2010, the NTIA removed the requirement to drop records based on speeds that did not meet the subdomain requirements and requested they be included. As a result of this change, records that had been previously dropped because they did not meet the subdomain requirements, but met the minimum requirements to be classified as a Broadband provider, were added back into the dataset.

3 Data Validation

Sanborn has planned the following data validation steps to ensure that the data from providers are correct. We describe below our approach to checks, the status as relates to the submitted data, and challenges with each check.

Sanborn believes that validation is a long-term activity that will occur throughout the course of this project and that more validation follows as after Georgia's broadband maps and interactive sites are made available to the public. For this submission, we completed our initial preliminary checks and validation on the data and identified areas of concern for further investigation and verification.

- At this point, we believe that we do not have sufficient information to alter provider data and we have been careful not to do so unless there are obvious errors such as incorrect block numbers, or unidentifiable street segments, etc.

1) QC of the data at various steps

Sanborn begins with preliminary QC checks on data from the time they come to when they get processed and put through official QC. This continues through various checkpoints during our process (such as looking for the maximum and minimum values, averages of fields, determining what percentage of a field is populated and whether null values are allowed, visual and spatial checks, etc.). This process has been applied to all datasets received from providers. Because the broadband data provided to us have varied widely in completeness and formats, these checks have been challenging to keep consistent and uniform without additional and repeated checks by Sanborn.

When incomplete data is submitted, Sanborn has made efforts to get correct data by going back to the providers. Some providers have given explanation of missing data, or resubmitted data. Others have responded that they provided what they could, or have not responded at all. Consequently, some of the information submitted to NTIA includes incomplete data where certain fields of information were not filled in by the providers. For the next few submissions, we are requesting guidance from NTIA about which datasets are more critical than others and which fields we need to improve data collection efforts. We are hoping that in the next submission we will be able to improve the data collected for each provider either because we will be asking for less data, or we will have additional sources of information available to us such as our speed tests, etc.

2) Verification by providers

Sanborn processed provider data and created NTIA products from this information. The processed data has been mapped and was made available to the Providers in the form of KML files or other formats where

specifically requested by Providers. These enabled the providers to review their data using free online tools or their own commercial GIS software and to provide feedback to Sanborn to improve their datasets. Because KMLs are compatible with Google Earth and other similar free tools, Providers are able to visualize their data in a high rich, easy to use environment. Sanborn also had available a web portal that would allow the Providers to view their data in a secure hosted mapping environment, but it was found that the providers preferred the KML option.

The providers were given at least five business days for reviewing the data and providing us any feedback. The feedback resulted in some requests for data corrections, which were made by Sanborn. Not all providers responded with feedback and where no request for changes or additional review time were received, the data was deemed to be correct. However, in this cycle, as opposed to the 1st submission, Sanborn has received more response out of the providers.

Due to the feedback received during the 1st submission, Sanborn elected to represent the data in a different manner to limit confusion. Where coverage was in a census block greater than 2 square miles, the census blocks as well as the road segment were shown to the provider to make the coverage area clearer. This method of data presentation greatly reduced the amount of questions and queries.

By asking providers to validate draft maps of their service areas Sanborn was able to improve the data for the providers significantly. This has been a very popular quality check point with the providers.

3) Speedtest data collection and other data collection for verification

Sanborn will begin collecting speed test data through our Community Anchor Institution survey form online. We are waiting to release the speed test to the public at the same time as we release the interactive searchable map. Then as we get more speed tests to create speed maps for the state, we can compare the results against information we have from providers.

In addition to this, Sanborn asked Community Anchor Institutions to give information on providers they subscribe to. This data when collected can be used for verification purposes.

4) Data Validation Conclusions

In conclusion, at this stage, we have only conducted validation involving activities 1 and 2 above. More validation will be performed to improve the next deliveries. We have flagged areas of concerns but have not modified data from providers significantly for this delivery. We believe we do not have sufficient knowledge to alter provider service areas. For example, in areas with spotty coverage where an individual provider's coverage has holes or "donuts", we have left it blank and not filled in the gaps. It is our assumption that providers would not under-represent their

own service areas. We have also heard from providers that they are concerned about the data format of blocks and street segments over-reporting their service areas. Thus, they are worried about customers asking for service in areas outside their service area. Where providers say they do not provide service, we assume that they do not serve on those blocks for a variety of reasons (for example a provider may provide service only to commercial clients and not residential and hence filling in the gaps could lead to some wrong assumptions on our part). We will need more input from NTIA whether we should alter provider reported data and how we annotate areas of concerns.

Through provider check plots and maps, we believe that we have been able to provide an opportunity to providers to fill in the blanks by seeing their service areas spatially. As more information is collected through speed tests and Community Anchor Institutions, we will work with the Providers to improve the data and map

4 Appendices

4.1 Appendix 1: Broadband Reference Datasets and Domains

This appendix describes the database schema used to contain all reference data used during broadband data processing.

4.2 Spatial Projection Note

All reference feature classes use the “**WGS_1984_Web_Mercator**” projection system described in the NTIA submission specification.

4.2.1 Block

Column	Type	Width	Domain	Definition	Notes
ref_BlockID	String	16		Full Census Block ID	Concatenated census block elements
ref_CBYear	String	4	Census Year	Census geography year	
ref_SMI	Double	8		Area of Census Block in square miles	Total land and water area
ref_LE2SMI	String	1	Yes or No	Is Census Block less than 2 square miles?	
ref_BlockID_wo_suffix	String	15		Full Census Block ID without suffix	

4.2.2 Road

Column Name	Type	Width	Domain	Definition	Notes
ref_TLID	Long Integer	4		Road Segment TIGER Line ID	
ref_CBYear	String	4	Census Year	Census geography year	
ref_GT2SMI	String	1	Yes and No	Is Road Segment greater than 2 sq miles?	
ref_AddMin	String	10		Starting segment address number	
ref_AddMax	String	10		Ending segment address number	
ref_FullName	String	100		Full Street Name information	
ref_PreDir	String	2		Prefix Direction	
ref_StreetName	String	50		Street Name	
ref_StreetType	String	10		Street Type	
ref_SufDir	String	2		Suffix Direction	
ref_StateAbbr	String	2		Two-letter state postal abbreviation	
ref_Zip5	String	5		5-digit ZIP code (with leading zeros)	

4.2.3 Overview

Column Name	Type	Width	Domain	Definition	Notes
ref_GeogUnit	String	6	Geography Unit Type	Geography being used	County, CMA, or CBSA
ref_GeogUnitID	String	20		Unique ID of feature	
ref_name	String	50		Reference Feature Name	

4.2.4 State

Column Name	Type	Width	Domain	Definition	Notes
ref_StateAbbr	String	2		1Two-letter state postal abbreviation	
ref_StateFIPS	String	2		State ANSI (or FIPS) identifier(ss)	Leading zeros required

4.2.5 Census Year Domain

Domain Property	Value
Description	Census Data Year
Field Type	Text
Domain Type	Coded Values
Character Width	4

Domain Code	Description
2000	2000 Census Data
2009	2009 Census Data
HYBR	Hybrid Census Data

4.2.6 Yes and No Domain

Domain Property	Value
Description	Yes or No Code
Field Type	Text
Domain Type	Coded Values
Character Width	1

Domain Code	Description
Y	Yes
N	No

4.2.7 Geographic Unit Type Domain

Domain Property	Value
Description	Geographic Unit Type
Field Type	Text
Domain Type	Coded Values
Character Width	4

Domain Code	Description
CMA	Cellular market Area (FCC assigned)
CO	County (StateFIPS + CountyFIPS; Census assigned)
MSA	Metropolitan / Micropolitan Statistical Areas (OBM assigned)
CBSA	Core Based Statistical Areas (OBM assigned)

4.3 Appendix 2: NTIA Submission Dataset Schema changes

The September 8th version of the NTIA data model was used as the basis for the submission 2 data model. This appendix describes the changes made to this data model due to issues that were found. Based on NTIA analysis, the issues fell into three categories:

1. **"All Other" TRANSTECH code** - The All Other category was intended for cases where the technology did not fit any other of the existing ones in the model and no business rules have been applied to it. The valid range of speeds used for this should be the ones listed in the Federal Register although some users have already reported to us higher available speeds.
2. **Null Values for Overview MAXADDOWN and MAXADUP** - Nulls are not allowed on the Overview feature class for MAXADVUP and MAXADDOWN by design. The overview feature class represents a higher level or more generalized type of data, and null information for speeds is intentionally not allowed at that level. For more detailed layers like census blocks, road segments, and addresses these fields can have null values.
3. **Coded Value Domains** - Some of the coded value domains are not linked to the correct subtype, these can be fixed in the database. Many of the speed codes are the same across transmission technologies minimizing the overall impact. The subtype links will be corrected in the next version of the model.

The table below lists the data model issues that were found, and the resolutions (i.e. changes to the data model) that were made:

#	Feature Class	Issue	Resolution
1		TRANSTECH of All Other does not have any sub domain tables to select	Created two domain tables, one called All Upload (2 -11) and another called All Download (3-11)
2		Domain Transmission of Technology has TRANSTECH 40 is named Cable Modem - DOCIS 3.0 Down	removed the word "Down" - new values is DOCIS 3.0
3	BB_Service_Address	Subtype for TransTech Symmetric xDSL - MAXADDOWN domain set to AxDL Down	domain set to Symmetric xDSL Down
4	BB_Service_Address	Subtype for TransTech Symmetric xDSL -MAXADUP domain set to AxDL Up	domain set to Symmetric xDSL Up
5	BB_Service_Address	Subtype for TransTech Other Copper Wireline - MAXADDOWN domain set to Satellite Down	domain set to Other Copper Wireline Down
6	BB_Service_Address	Subtype for TransTech Other Copper Wireline - MAXADUP domain set to Symmetric xDSL Up	domain set to Other Copper Wireline Up
7	BB_Service_Address	Subtype for TransTech Other Copper Wireline - TYPICDOWN domain set to Symmetric xDSL Down	domain set to Other Copper Wireline Down
8	BB_Service_Address	Subtype for TransTech Other Copper Wireline - TYPICUP domain set to Symmetric xDSL Up	domain set to Other Copper Wireline Up

#	Feature Class	Issue	Resolution
9	BB_Service_Address	Subtype for TransTech TRANSTECH 40 is named Cable Modem - DOCIS 3.0 Down	removed the word "Down"
10	BB_Service_Address	Subtype for TransTech Terrestrial Fixed Wireless - Unlicensed - TYPICDOWN domain set to Terrestrial Fixed Wireless Licensed Down	domain set to Terrestrial Fixed Wireless Unlicensed Down
11	BB_Service_Address	Subtype for TransTech Terrestrial Fixed Wireless - Licensed - MAXADOWN domain set to Terrestrial Mobile Wireless Down	domain set to Terrestrial Fixed Wireless Licensed Down
12	BB_Service_Address	Subtype for TransTech Terrestrial Fixed Wireless - Licensed - MAXADUP domain set to Terrestrial Mobile Wireless UP	domain set to Terrestrial Fixed Wireless Licensed Up
13	BB_Service_Address	Subtype for TransTech Terrestrial Fixed Wireless - Licensed - TYPICDOWN domain set to Terrestrial Mobile Wireless Down	domain set to Terrestrial Fixed Wireless Licensed Down
14	BB_Service_Address	Subtype for TransTech Terrestrial Fixed Wireless - Licensed - TYPICUP domain set to Terrestrial Mobile Wireless Up	domain set to Terrestrial Fixed Wireless Licensed Up
15	BB_Service_Address	All Other - MAXADDOWN - no domain set	domain set to All Download
16	BB_Service_Address	All Other - MAXADUP - no domain set	domain set to All Upload
17	BB_Service_Address	All Other - TYPICDOWN - no domain set	domain set to All Download
18	BB_Service_Address	All Other - TYPICUP - no domain set	domain set to All Upload
19	BB_Service_CAlnstatutions	TRANSTECH 40 is named Cable Modem - DOCIS 3.0 Down	removed the word "Down"
20	BB_Service_CAlnstatutions	All Other - MAXADDOWN - no domain set	domain set to All Download
21	BB_Service_CAlnstatutions	All Other - MAXADUP - no domain set	domain set to All Upload
22	BB_Service_CensusBlock	TRANSTECH 40 is named Cable Modem - DOCIS 3.0 Down	removed the word "Down"
23	BB_Service_CensusBlock	Cable Modem - DOCIS 3.0 - MAXADDOWN does not have any domain assigned	domain set to Cable Modem - DOCIS 3.0 Down
24	BB_Service_CensusBlock	Cable Modem - Other - MAXADDOWN domain set to Cable Modem DOCIS 3.0 Down	domain set to Cable Modem - Other Down
25	BB_Service_CensusBlock	Cable Modem - Other - MAXADUP domain set to Cable Modem DOCIS 3.0 Up	domain set to Cable Modem - Other Up
26	BB_Service_CensusBlock	Cable Modem - Other - TYPICDOWN domain set to Cable Modem DOCIS 3.0 Down	domain set to Cable Modem - Other Down
27	BB_Service_CensusBlock	Cable Modem - Other - TYPICDUP domain set to Cable Modem DOCIS 3.0 Up	domain set to Cable Modem - Other Up
28	BB_Service_CensusBlock	TRANSTECH 71 is named Terrestrial Mobile Wireless	renamed to Terrestrial Fixed Wireless - Licensed
29	BB_Service_CensusBlock	All Other - MAXADDOWN - no domain set	domain set to All Download
30	BB_Service_CensusBlock	All Other - MAXADUP - no domain set	domain set to All Upload
31	BB_Service_CensusBlock	All Other - TYPICDOWN - no domain set	domain set to All Download
32	BB_Service_CensusBlock	All Other - TYPICUP - no domain set	domain set to All Upload
33	BB_Service_RoadSegment	Asymmetric xDSL - MAXADDOWN domain set to AxDSL Up	domain set to AxDSL Down
34	BB_Service_RoadSegment	Asymmetric xDSL - MAXADUP domain set to AxDSL Down	domain set to AxDSL Up
35	BB_Service_RoadSegment	Asymmetric xDSL - TYPICDOWN domain set to AxDSL Up	domain set to AxDSL Down
36	BB_Service_RoadSegment	Asymmetric xDSL - TYPICUP does not have any domain assigned	domain set to AxDSL Up

#	Feature Class	Issue	Resolution
37	BB_Service_RoadSegment	Terrestrial Fixed Wireless - Unlicensed - TYPICDOWN domain set to Terrestrial Mobilewireless Down	domain set to Terrestrial Fixed Wireless Unlicensed Down
38	BB_Service_RoadSegment	All Other - MAXADDOWN - no domain set	domain set to All Download
39	BB_Service_RoadSegment	All Other - MAXADUP - no domain set	domain set to All Upload
40	BB_Service_RoadSegment	All Other - TYPICDOWN - no domain set	domain set to All Download
41	BB_Service_RoadSegment	All Other - TYPICUP - no domain set	domain set to All Upload
42	BB_Service_Wireless	Cable Modem - DOCIS 3.0 - MAXADDOWN domain set to Other Copper Wireline Down	domain set to Cable Modem - DOCIS 3.0 Down
43	BB_Service_Wireless	Cable Modem - DOCIS 3.0 - MAXADUP domain set to Other Copper Wireline Up	domain set to Cable Modem - DOCIS 3.0 Up
44	BB_Service_Wireless	Cable Modem - DOCIS 3.0 - TYPICDOWN domain set to Other Copper Wireline Down	domain set to Cable Modem - DOCIS 3.0 Down
45	BB_Service_Wireless	Cable Modem - DOCIS 3.0 - TYPICUP domain set to Other Copper Wireline Up	domain set to Cable Modem - DOCIS 3.0 Up
46	BB_Service_Wireless	Cable Modem - Other - MAXADDOWN domain set to Other Copper Wireline Down	domain set to Cable Modem - Other Down
47	BB_Service_Wireless	Cable Modem - Other - MAXADUP domain set to Other Copper Wireline Up	domain set to Cable Modem - Other Up
48	BB_Service_Wireless	Cable Modem - Other - TYPICDOWN domain set to Other Copper Wireline Down	domain set to Cable Modem - Other Down
49	BB_Service_Wireless	Cable Modem - Other - TYPICUP domain set to Other Copper Wireline Up	domain set to Cable Modem - Other Up
50	BB_Service_Wireless	All Other - MAXADDOWN - no domain set	domain set to All Download
51	BB_Service_Wireless	All Other - MAXADUP - no domain set	domain set to All Upload
52	BB_Service_Wireless	All Other - TYPICDOWN - no domain set	domain set to All Download
53	BB_Service_Wireless	All Other - TYPICUP - no domain set	domain set to All Upload
54	BB_Service_Wireless	All Other - STATEABBR - no domain set	domain set to STUSPS
55	BB_Service_Overview	TRANSTECH 40 is named Cable Modem - DOCIS 3.0 Down	removed the word "Down"
56	BB_Service_Overview	Terrestrial Fixed Wireless - Unlicensed - MAXADUP domain set to Terrestrial Fixed Wireless Licensed Up	domain set to Terrestrial Fixed Wireless Unlicensed Up
57	BB_Service_Overview	All Other - MAXADDOWN - no domain set	domain set to All Download
58	BB_Service_Overview	All Other - MAXADUP - no domain set	domain set to All Upload

In addition to the items above, the following changes were made based on NTIA recommendation:

- Allow terrestrial fixed wireless (licensed and unlicensed) upload speeds of 2 (add this as a valid value in each of the terrestrial upload domains)
- In the wireless spectrum domain, “change is Unlicensed (including broadcast television “white spaces”) Spectrum Used to provide service.” To “is Unlicensed (including broadcast television “white spaces”) used to provide service”
- Added Speed tier 2 for ALL tech subtypes – up and down
- For techtrans 40 and 41 added tier 9 & 10 for up and down

- For submission 1 WGS 84 Web Mercator projection was used. For submission 2, we are projecting the NTIA submission data to the required WGS_84 projection.